Trend Study 13A-11-99

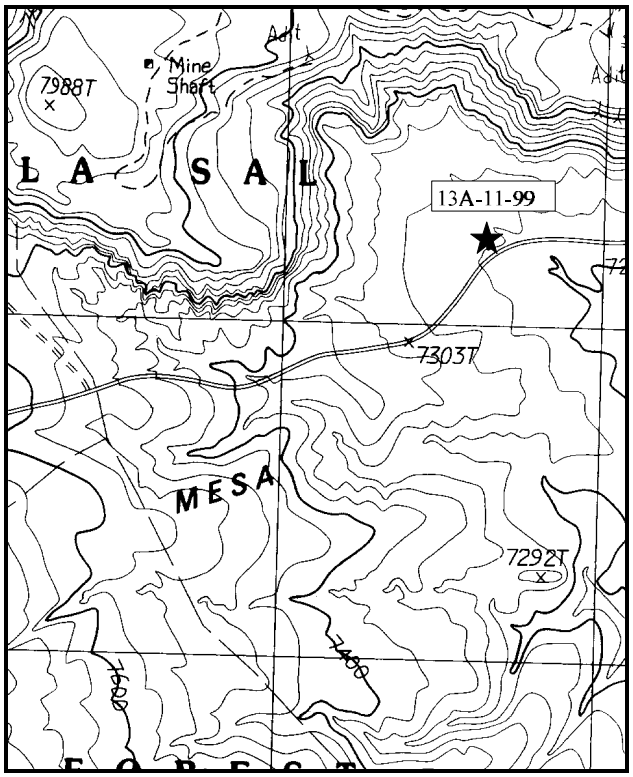
Study site name: North Beaver Mesa . Range type: Big Sagebrush .

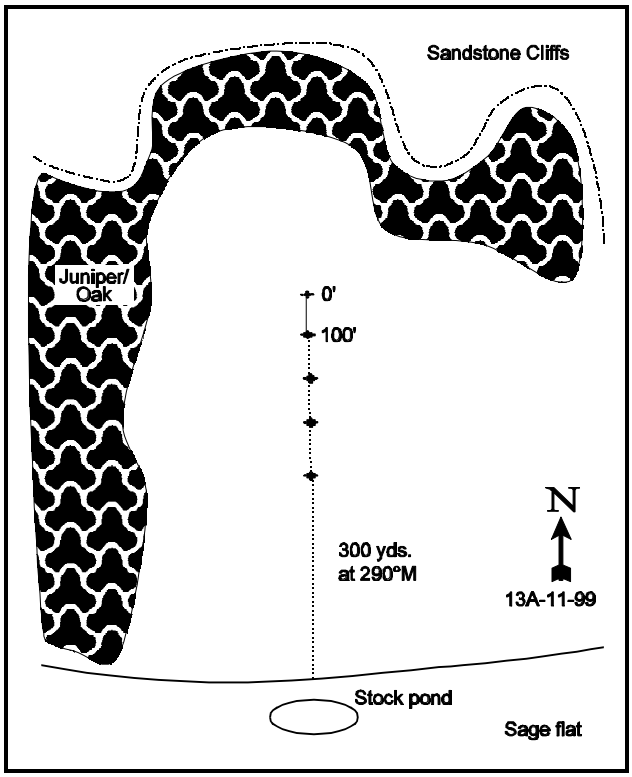
Compass bearing: frequency baseline 133°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the intersection of the LaSal Mountain Loop and Gateway roads, travel east towards Gateway, Colorado for 7.7 miles to the North Beaver Mesa turnoff. Turn left and go 4.2 miles to the Polar Mesa/Fisher Valley Road. Continue straight through this fork, over a cattleguard and 0.85 miles to a stockpond at the head of a large sagebrush valley. The transect is located to the west towards an alcove. It is marked by l-foot tall fence posts. The 0-foot baseline stake is furthest away and is tagged #7842.





Map Name: Fisher Valley Diagrammatic Sketch

Township 25S , Range 25E , Section NE 1/4,10 UTM 4279392.142 N, 661326.424 E

DISCUSSION

Trend Study No. 13A-11 (33-11)

The North Beaver Mesa study is an area on the northeast side of the LaSal Mountains that receives a considerable amount of winter elk use. This was confirmed by 1994 pellet group frequency data showing that elk pellets had a 55% quadrat frequency, while deer had a frequency of 26%. Pellet group surveys in 1999 lent further support of this kind of use as they indicated there was 17 cow days use/acre (42 cdu/ha), 46 deer days use/acre (114 ddu/ha), and 155 elk days use/acre (383 edu/ha). The deer use the area mostly as a transition range in the spring and fall, depending on the severity of the winter. The Beaver allotment is grazed by cattle in the spring and fall. In 1962, 1,000 acres within the allotment was chained or contour trenched and seeded. A roller-chopper was used to retreat other parts of the allotment in 1985 and 1987, but did not include this area. The study is located in the upper part of a large sagebrush valley, where the only evidence of vegetative treatments is the partially filled-in contoured trenches and presence of seeded species (crested wheatgrass, intermediate wheatgrass, smooth brome, and alfalfa).

The study has a southeast aspect on a slope of less than 5% and an elevation of 7,300 feet. In contrast, to the east and west of the contour trenches, there are some natural gullies, especially further down in the valley. The trenches unquestionably help to slow down water and soil movement. These water and soil catchments also support the greatest grass cover. The reddish-brown, sandy loam soil appears to be moderately deep (effective rooting depth of 15 inches). The soil is neutral to slightly alkaline (7.4 pH) with a phosphorous content of 8.9 ppm. This could be a limiting factor for 10 ppm is thought to be the minimum for normal plant development. Livestock have a heavy impact on this soil for cattle trails and trampling have led to broken soil cover and soil movement.

Pinyon-juniper and oak clumps dominate the surrounding slopes. Except for a few seedlings, they are not very abundant in the sagebrush dominated valley bottoms. The point quarter method shows a pinyon density of 42 trees/acre with a average diameter of 1.25 inches and juniper density at 23 trees/acre with an average diameter of 6.75 inches. In addition to Wyoming big sagebrush, nine other browse species were encountered on the site. The available oak and scattered serviceberry have been highlined. White-stemmed rubber rabbitbrush is especially prevalent in the middle of the valley, with some plants showing moderate use. Other browse species are uncommon. Wyoming big sagebrush (on average) makes up 85% of the browse cover, with a moderately high density of 8,200 plants per acre in 1999. Almost half of the population was classified as young in 1987, declining to 18% by 1994, then increasing to 22% in 1999. Biotic potential (percentage of number of seedlings to the population) in 1987 was fairly good at 7%, increasing to 26% in 1994. It has since decreased again down to 5% in 1999. Seed production was low when it was first read, yet the mature plants appeared vigorous. Hedging is light to moderate on most plants.

As elk range, the grass component is especially important with an average of 84% of the grass cover coming from the three seeded species. However, with the grass being heavily utilized by livestock (late spring and summer), vigor is reduced and little forage is left for winter use. This is especially noticeable when coupled with summer drought, as was apparent with the 1994 data when grass cover was almost 25% less than in 1999.

Forb diversity is good with as many as 25 species sampled in 1994, however together they only provide a little over 4% cover. The common hairy goldaster is the most abundant forb (making up more than 50% of the forb cover) and it also has been heavily utilized. There are randomly scattered patches of alfalfa which were seldom picked up in the sampling design.

Percent litter cover is moderately low. Disturbance, compaction, trampling, and trailing caused by livestock grazing has disturbed the soil cover and hindered the development of cryptogamic soil. Percent bare ground is moderately high at 30%.

1994 TREND ASSESSMENT

The trend for soil is slightly improved, but still only in fair condition. Percent bare ground has gone down to 30% with litter cover decreasing slightly. Soils would be in much better condition if the herbaceous cover could be increased. This could occur with some rest from heavy early summer use. Browse trend is stable to slightly up even with the slight decrease noted in the population estimate. Much of the change is from the much larger sample size used in 1994. The population shows the characteristics of an expanding population with low rates of decadency and very high biotic potential. The trend for the herbaceous understory is stable because much of the change in nested frequency values was from the annual species.

TREND ASSESSMENT
soil - slightly improving, fair condition
browse - stable to slightly up
herbaceous understory - stable

1999 TREND ASSESSMENT

The trend for soil is basically unchanged and stable. Percent bare ground had gone down from the high in 1987 of 37% to 30% in 1994, with no change in 1999. Soils would be in much better condition if the herbaceous cover could be increased. This could occur with some type of management system of rest and deferment from heavy and continuous early summer use. Browse trend is stable to slightly up with increases in the sagebrush population, which on average makes up 85% of the browse cover. The population shows the characteristics of an expanding population with relatively low rates of decadency, and variable yet characteristically good biotic potential. The trend for the herbaceous understory is stable with increases for grasses but some losses for the forbs. The slight decrease in forb nested frequency is more than compensated for by the increase in grasses.

TREND ASSESSMENT
soil - stable, fair to good condition
browse - stable to slightly up
herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 13A, Study no: 11

Type	Species	Nested Frequency '87	'94	'99	Quadrat Frequency '87	'94	'99	Average Cover % '94	'99
G	Agropyron cristatum	b258	a232	c291	88	88	94	7.13	12.09
G	Agropyron intermedium	a41	b67	b70	14	22	26	1.58	1.15
G	Bouteloua gracilis	5	8	5	2	3	3	.33	.30
G	Bromus inermis	24	13	14	10	4	5	.36	.24
G	Bromus tectorum (a)	-	42	36	-	15	12	1.66	.52
G	Sporobolus cryptandrus	a-	b10	ab4	-	5	2	.08	.01
G	Stipa comata	a-	b6	ab4	-	3	2	.01	.18
G	Vulpia octoflora (a)	-	2	-	-	1	-	.00	-
Total for Annual Grasses		0	44	36	0	16	12	1.66	0.52
Total for Perennial Grasses		328	336	388	114	125	132	9.50	13.98
Total for Grasses		328	380	424	114	141	144	11.16	14.51

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'87	'94	'99	'87	'94	'99	'94	'99
F	Alyssum spp. (a)	-	3	-	-	1	-	.00	-
F	Arabis spp.	-	1	-	-	1	-	.00	-
F	Artemisia ludoviciana	a-	b9	ab3	-	3	1	.18	.03
F	Astragalus convallarius	8	16	12	4	9	4	.36	.07
F	Aster spp.	-	-	5	-	-	2	-	.01
F	Astragalus spp.	8	7	6	4	4	2	.02	.01
F	Castilleja linariaefolia	-	-	2	-	-	1	-	.00
F	Calochortus nuttallii	1	-	-	1	-	-	-	-
F	Collinsia parviflora (a)	-	b13	a-	-	5	-	.02	-
F	Cruciferae	b28	a-	a-	11	-	-	-	-
F	Delphinium nuttallianum	1	-	-	1	-	-	-	-
F	Draba reptans (a)	-	4	1	-	3	1	.01	.00
F	Eriogonum cernuum (a)	-	2	-	-	1	-	.00	-
F	Erigeron pumilus	25	14	18	14	7	9	.06	.19
F	Eriogonum racemosum	a27	b47	ab39	12	20	19	.30	.69
F	Euphorbia spp.	1	-	-	1	-	-	-	-
F	Fritillaria atropurpurea	a-	b10	a-	-	5	-	.02	-
F	Gayophytum ramosissimum (a)	-	3	-	-	2	-	.01	-
F	Heterotheca villosa	b214	a102	a78	81	47	40	2.76	2.44
F	Lactuca serriola	b4	a-	a-	3	-	-	-	-
F	Lepidium densiflorum (a)	-	3	-	-	1	-	.00	-
F	Lesquerella ludoviciana	3	2	3	1	2	1	.01	.00
F	Lithospermum ruderale	a-	b14	a-	-	7	-	.20	-
F	Machaeranthera canescens	15	26	16	8	11	8	.05	.31
F	Medicago sativa	a-	b10	ab4	-	4	1	.42	.18
F	Microsteris gracilis (a)	-	16	17	-	8	7	.04	.03
F	Oenothera coronopifolia	c39	b11	a-	15	6	-	.03	-
F	Oxybaphus linearis	-	1	-	-	1	-	.00	-
F	Petradoria pumila	1	-	-	1	-	-	-	-
F	Phlox longifolia	9	4	6	4	2	2	.01	.03
F	Polygonum douglasii (a)	-	1	8	-	1	3	.00	.01
F	Senecio multilobatus	3	-	-	1	-	-	-	-
F	Sphaeralcea coccinea	11	12	13	8	5	8	.05	.14
F	Tragopogon dubius	c17	b4	a-	10	3	-	.01	-
F	Trifolium spp.	4	-	-	1	-	-	-	-
F	Unknown forb-perennial	b11	a-	a-	6	-	-	-	-
Total for Annual Forbs		0	45	26	0	22	11	0.11	0.05
Total for Perennial Forbs		430	290	205	187	137	98	4.54	4.13
Total for Forbs		430	335	231	187	159	109	4.65	4.19

Values with different subscript letters are significantly different at % = 0.10

BROWSE TRENDS --
Herd unit 13A, Study no: 11

Type	Species	Strip Frequency '94	'99	Average Cover % '94	'99
B	Amelanchier utahensis	5	3	.15	.03
B	Artemisia frigida	2	4	.00	-
B	Artemisia tridentata wyomingensis	77	97	23.59	19.26
B	Atriplex canescens	2	2	-	.15
B	Chrysothamnus nauseosus	8	6	.49	.24
B	Eriogonum microthecum	11	14	.21	.25
B	Gutierrezia sarothrae	30	14	1.81	.57
B	Opuntia spp.	8	6	.11	.09
B	Pinus edulis	0	4	.53	2.07
B	Quercus gambelii	-	-	.85	-
Total for Browse		143	150	27.76	22.68

CANOPY COVER --
Herd unit 13A, Study no: 11

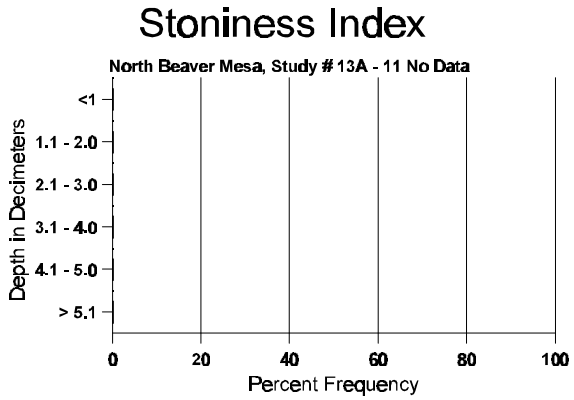
Species	Percent Cover '99
Pinus edulis	.80
Quercus gambelii	.40

BASIC COVER --
Herd unit 13A, Study no: 11

Cover Type	Nested Frequency '94	'99	Average Cover % '87	'94	'99
Vegetation	319	342	15.75	40.55	40.91
Rock	4	3	0	.15	.15
Pavement	20	16	0	.42	.11
Litter	377	345	43.50	41.52	40.15
Cryptogams	68	90	3.50	1.58	3.35
Bare Ground	306	269	37.25	30.21	29.78

SOIL ANALYSIS DATA --
Herd Unit 13A, Study # 11, Study Name: North Beaver Mesa

Effective rooting depth (cm)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
15.1	55.4 (16.7)	7.4	70.9	11.8	17.3	1.6	8.9	92.8	0.4



PELLET GROUP DATA --
Herd unit 13A, Study no: 11

Type	Quadrat Frequency '94	Quadrat Frequency '99	Pellet Transect Days Use/Acre (ha) '99
Rabbit	19	5	N/A
Horse	-	1	N/A
Elk	55	52	155 (383)
Deer	26	20	46 (114)
Cattle	-	5	17 (42)

BROWSE CHARACTERISTICS --
Herd unit 13A, Study no: 11

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier utahensis																		
Y	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	2	-	-	-	-	-	-	-	1	3	-	-	-	60			3
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40	15	11	2
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	36	34	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	
'94	00%	20%	00%	-40%
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:	
	'87	0		-
	'94	100		-
	'99	60		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia frigida																		
S	87	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	87	8	-	1	-	-	-	-	-	-	9	-	-	-	600			9
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	5	-	-	-	-	-	-	-	-	5	-	-	-	100	8	9	5
	99	3	-	-	2	-	-	-	-	-	5	-	-	-	100	10	5	5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	11%	00%	-83%
'94	00%	00%	00%	+ 0%
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	600	Dec:	-
	'94	100		-
	'99	100		-

Artemisia tridentata wyomingensis																		
S	87	11	-	-	-	-	-	-	-	-	9	1	1	-	733			11
	94	81	-	-	30	-	-	6	-	-	117	-	-	-	2340			117
	99	15	8	-	-	-	-	-	-	-	23	-	-	-	460			23
Y	87	52	24	-	-	-	-	-	-	-	76	-	-	-	5066			76
	94	39	9	-	8	-	-	-	-	-	56	-	-	-	1120			56
	99	41	49	2	-	-	-	-	-	-	92	-	-	-	1840			92
M	87	17	30	3	-	-	-	-	-	-	50	-	-	-	3333	19	22	50
	94	134	71	10	-	-	-	-	-	-	202	-	13	-	4300	16	28	215
	99	86	125	28	-	-	3	-	-	-	242	-	-	-	4840	24	36	242
D	87	21	5	3	-	-	-	-	-	-	26	-	1	2	1933			29
	94	20	14	2	-	-	-	-	-	-	16	-	9	11	720			36
	99	21	40	10	4	-	-	1	-	-	53	1	1	21	1520			76
X	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	420			21
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	660			33

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	38%	04%	02%	-41%
'94	31%	04%	11%	+25%
'99	52%	10%	05%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	10332	Dec:	19%
	'94	6140		12%
	'99	8200		19%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Atriplex canescens																		
Y	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	2	-	-	-	-	-	-	-	2	-	-	-	40	16	19	2
	99	-	1	-	-	-	-	-	-	-	1	-	-	-	20	20	15	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	
'94	67%	00%	00%	+25%
'99	25%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	0	Dec:	-
	'94	60		-
	'99	80		-

Chrysothamnus nauseosus																		
S	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	87	-	1	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	3	-	-	-	-	-	-	-	-	2	-	1	-	60			3
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
M	87	2	-	1	-	-	-	-	-	-	1	-	2	-	200	34	25	3
	94	8	-	-	-	-	-	-	-	-	8	-	-	-	160	29	26	8
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80	20	32	4
D	87	1	-	-	-	-	-	-	-	-	-	1	-	-	66			1
	94	1	-	-	-	-	-	-	-	-	-	-	1	-	20			1
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	20%	20%	40%	-28%
'94	00%	00%	17%	-17%
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	332	Dec:	20%
	'94	240		8%
	'99	200		20%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Eriogonum microthecum																		
S	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	2	1	-	-	-	-	-	-	-	3	-	-	-	60			3
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	87	9	-	-	-	-	-	-	-	-	9	-	-	-	600			9
	94	3	4	-	-	-	-	-	-	-	7	-	-	-	140			7
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	22	-	-	2	-	-	-	-	-	24	-	-	-	480	11	8	24
	99	14	1	4	2	-	-	-	-	-	21	-	-	-	420	7	6	21
D	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	1	1	-	-	-	-	-	-	2	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	+ 3%
'94	13%	00%	00%	-13%
'99	07%	19%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'87	600	Dec:		0%
'94	620			0%
'99	540			7%

Gutierrezia sarothrae																		
S	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	20	-	-	-	-	-	-	-	-	20	-	-	-	400			20
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	87	9	-	-	-	-	-	-	-	-	9	-	-	-	600			9
	94	7	-	-	-	-	-	-	-	-	7	-	-	-	140			7
	99	8	-	-	-	-	-	-	-	-	8	-	-	-	160			8
M	87	1	-	-	-	-	-	-	-	-	1	-	-	-	66	6	5	1
	94	82	-	-	1	-	-	-	-	-	83	-	-	-	1660	10	11	83
	99	22	30	-	-	-	-	-	-	-	52	-	-	-	1040	8	8	52
D	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	+63%
'94	00%	00%	01%	-34%
'99	50%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'87	666	Dec:		0%
'94	1820			1%
'99	1200			0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
S	87	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	87	4	-	-	-	-	-	-	-	-	2	-	2	-	266	4	14	4
	94	14	-	-	-	-	-	-	-	-	14	-	-	-	280	4	9	14
	99	3	-	-	1	-	-	-	-	-	5	-	-	-	100	5	13	5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	50%	+ 5%
'94	00%	00%	00%	-43%
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	266	Dec:	-
	'94	280		-
	'99	160		-

Pinus edulis																		
S	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	1	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	
'94	00%	00%	00%	
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	0	Dec:	-
	'94	0		-
	'99	80		-